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NEIC

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SAFE DRINKING WATER ACT SANITARY SURVEY

Newark Water Department
Newark, New Jersey
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APPENDICES (NEIC-Created Documents)***

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INTRODUCTION

At the request of U.S. Environmental Protection Agency (EPA) Region 2, EPA's National Enforcement Investigations Center (NEIC) performed a sanitary survey of the Newark Water Department public water system (Newark PWS) in Newark, New Jersey. The City of Newark Department of Water and Sewer Utilities operates and manages the Newark PWS and provides potable water to the City of Newark and surrounding areas (PWS ID No. NJ0714001). The purpose of the sanitary survey was to evaluate and document the capabilities of Newark PWS programs, sources, treatment, storage, distribution network, operation and maintenance, and overall management to continually provide safe drinking water and identify any deficiencies that may adversely impact the public water system.

GENERAL BACKGROUND

The City of Newark water sources are the Pequannock and Wanaque North and South watersheds. The City of Newark owns and operates the Pequannock system, but the North Jersey District Water Supply Commission operates the Wanaque North and South systems. The Pequannock watershed includes five raw water supply reservoirs: Charlotteburg, Echo Lake, Canistear, Clinton, and Oak Ridge Reservoirs. According to the Newark Watershed Conservation and Development Corporation website, http://newarkwatershed.com, Charlotteburg Reservoir is the final reservoir in the Pequannock watershed, and is the primary source of raw water for the Newark PWS.

Charlotteburg Reservoir is part of the Highlands Basin Aquifer System and is located near Newfoundland, New Jersey. According to Michael Awertschenko, Pequannock water filtration plant (PWFP) superintendent, air is introduced at the bottom of Charlotteburg Reservoir to prevent stratification and oxidize organic manganese. In addition, copper sulfate is added seasonally to control algal blooms. Raw water from Charlotteburg Reservoir is fed by gravity flow to Charlotteburg Dam and is transported through two sets of traveling screens. The traveling screens include two fine screens to remove large objects (e.g., sticks, vegetation, fish, etc.).

Screened raw water from Charlotteburg Reservoir is sent through a channel that leads to Newark PWS's chemical building (also called the pretreatment building during the sanitary survey). The water in the channel flows through a series of pretreatment structures. First, a mixture of aluminum potassium sulfate (alum) and polymer are mixed into the water to promote coagulation and increase settling. Chlorine gas is injected into the raw water via a diffuser for disinfection. Calcium carbonate (or lime) is added for pH adjustment. From the chemical building, the water is transported through a 72-inch concrete pipe to the PWFP.

The PWFP is the City of Newark's filtration plant and is used to remove color and turbidity from the disinfected water. According to Andrew Pappachen (A. Pappachen), the

PWFP's licensed operator, the PWFP peak flow was designed to accept 80 million gallons per day (mgd) total system flow. However, the PWFP total production capacity is 45 to 50 mgd. The water undergoes a series of treatment steps, including a four-stage mixing chamber where water flows through a baffle configuration for chemical mixing, 12 gravity filters to remove solids and decrease turbidity, and a post-chlorination process. Wastewater from sand filters returns to the head works of the PWFP, and the filter sludge is sent to an on-site sedimentation pond (also known as the sludge pond). Treated water from the PWFP is transferred via the Pequannock Aqueducts to Cedar Grove Reservoir in Cedar Grove, New Jersey.

In order to manage disinfection byproducts (DBPs) produced during the treatment process, Newark PWS has placed a chlorine booster station at the Montclair Station, which is located just below the intake for Cedar Grove Reservoir. Sodium hypochlorite is added to the water at the Montclair Station as a booster disinfectant.

Cedar Grove Reservoir is Newark PWS's uncovered finished water reservoir. It is located in a protected wildlife area, and downhill from a residential community. Newark PWS personnel have limited access. Waterfowl and other animals have access to Cedar Grove Reservoir. Newark PWS is currently under an administrative order with the New Jersey Department of Environmental Protection (NJDEP) that will require Cedar Grove Reservoir to be in compliance with the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR).

Newark PWS's primary distribution system is the Pequannock Aqueducts, which include 42-inch and 48-inch ductile iron distribution pipes. The Pequannock Aqueducts were installed in the late 1800s, and have not been properly cleaned since their installation. A. Pappachen also stated that the water system loss rate (or unaccounted for water loss rate) is between 20 and 25 percent.

More information on treatment, monitoring, and operations is provided in the Newark NEIC Inspection Report Form **(Appendix A).**

REGULATORY BACKGROUND

National Primary Drinking Water Regulations (NPDWRs) are incorporated or codified in 40 Code of Federal Regulations (CFR) Part 141. The Safe Drinking Water Act (SDWA) requires the EPA to establish regulations for contaminants in drinking water that may have an adverse effect on the public health. The NPDWRs include maximum contaminant levels (MCLs) or treatment techniques for more than 100 contaminants. SDWA requirements are implemented primarily by the states.

According to New Jersey's administrative code (NJAC) 7:10, *Safe Drinking Water Act Rules*, NJDEP has the authority to implement the SDWA regulations in New Jersey. NJAC 7:10 covers the New Jersey SDWA. Specifically, NJAC 7:10-5.1, Applicability of National Regulations, states, "…the Department adopts and incorporates herein by reference the National

Primary Drinking Water Regulations, 40 CFR 141, as amended and supplemented, including all siting requirements, filtration and disinfection requirements, maximum contaminant levels, monitoring and analytical requirements, reporting requirements, public notification requirements, recordkeeping requirements, and the National Primary Drinking Water Regulations Implementation, 40 CFR 142 Subparts E, F, G and K, for variance and exemption requirements as the New Jersey primary drinking water regulations, applicable to all public water systems."

The City of Newark Department of Water and Sewer Utilities operates and manages the Newark PWS that provides potable water to the City of Newark and surrounding areas (PWS ID No. NJ0714001). The federal SWDA and the New Jersey SDWA state that if a PWS has at least 15 service connections and serves at least 25 people per day for 60 days of the year, then the federal SWDA and the New Jersey SDWA requirements apply to this PWS. The City of Newark has approximately 57,616 connections and a population of 273,000. As promulgated under the NJAC 7:10 SDWA rules, the Newark PWS is regulated and required to comply with the federal SDWA and the New Jersey SDWA requirements.

ON-SITE INSPECTION SUMMARY

Sanitary Survey Activities

The NEIC inspection team conducted the on-site sanitary survey of the Newark PWS from February 10 through 14, 2014. The NEIC inspection team included Christine Alvarez (project manager), David Parker (SDWA technical lead), Kacy Sable, and Daren Vanlerberghe.

The sanitary survey included a comprehensive on-site evaluation of the Newark PWS components and operation and maintenance procedures. The sanitary survey objectives were to assess the physical infrastructure, as well as system operations, maintenance, and management aspects, including[1]:

- Sources (surface intakes)
- Finished water storage tanks
- Treatment (chlorination facilities and the PWFP)
- Distribution system operation and components (water lines, system pressure issues, and valves including isolation, pressure control, and others)
- Pumps, pump facilities, and pump controls
- Monitoring, reporting, and data verification
- Water system management and operations
- Operator compliance with state and licensing requirements

Credentials were presented to A. Pappachen during the opening meeting on February 10, 2014. A close-out meeting was held on February 14, 2014, to discuss the significant deficiencies

and observations. EPA Region 2 representatives Amy Vinciguerra, Rosa Brignoni, Kara Sinon, and Christopher Mecozzi participated in the closing meeting via phone. NJDEP representative Syed-Imad Rizvi participated in the close-out meeting, and Joseph Liccese participated via phone. NEIC stressed that final determinations will be made in conjunction with EPA Region 2 personnel and following review of documents provided by Newark PWS.

Regulatory violations, significant deficiencies and observations made by the NEIC inspection team during the Newark PWS sanitary survey are summarized below. Regulatory violations are areas where the water system was not in compliance with Federal or State requirements. According to 40 CFR § 141.723.b, significant deficiencies are defined by the EPA as "a defect in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system, that EPA determines to be causing, or has the potential for causing, the introduction of contamination into the water delivered to consumers." Observations are potential issues that may lead to a regulatory violation or significant deficiency if not corrected. All observations are documented in the NEIC field logbooks. The appendices cited in this report are highlighted and hyperlinked to the specified document. Photographs were taken by C. Alvarez and D. Vanlerberghe during the Newark PWS sanitary survey and are located in **Appendix B.**

Regulatory Violations:

1. No back-up power was available at the Wayne pump station as required by NJAC 7:10-11.6(i).

Significant Deficiencies

2. The most recent inspection report of the Belleville below-grade storage tank could not be located. Newark PWS management was unsure if it had ever been inspected or if finished water storage records were available. This is required under NJAC 7:10A 1.12.

3. The Newark PWS currently operates an uncovered finished water reservoir, Cedar Grove Reservoir. According to **40 CFR Part 141.714 (c) (1) or (2), the Newark PWS is required to do one of the following: "***(1) Systems must cover any uncovered finished water storage facility or (2) Systems must treat the discharge from the uncovered finished water storage facility to the distribution system to achieve inactivation and/or removal of at least 4-log virus, 3-log Giardia lamblia, and 2-log Cryptosporidium using a protocol approved by the State."*

   NEIC inspectors understand that the Newark PWS has made a treatment proposal submittal for the Cedar Grove Reservoir to the State of New Jersey and are awaiting a regulatory decision.

Summary of Observations:

4. No back-up power was available at the Clifton pump station (also known as the Chittenden Road Station).

5. A tree had fallen on the perimeter fence at Charlotteburg Reservoir. Although the tree had been removed, the damaged fence had not been repaired.

6. According to A. Pappachen, the sludge lagoon that holds backwash solids located near the PWFP is nearly full of solids. Newark PWS management reported that a contract had been issued to remove solids from the lagoon. This project needs to be completed in an expeditious manner for the lagoon to continue to be used for filter backwash storage and to prevent a discharge from the lagoon.

7. The NEIC inspection team noted that Newark PWS utility rates are among the lowest in the State of New Jersey, which appears to be having an impact on the Newark PWS's ability to currently secure bonds and could present further issues for Newark PWS as sources of funding are sought for capital improvements in the future.

8. The NEIC inspection team observed that the Magnafloc® secondary chemical containment area in the PWFP may not have sufficient capacity.

9. The NEIC inspection team noted that half of the filter #4 surface sweeps were not functioning. Newark PWS must develop and implement a filter maintenance program throughout the PWFP that addresses the filter media/support/under-drain system to prevent future occurrences of this and related issues.

10. The Newark PWS uses two transmission mains to bring finished water from the PWFP to the customers. Newark PWS has not undertaken a study to assess the condition of these lines and any associated vulnerabilities related to their age and condition.

11. The NEIC inspection team noted that the Newark PWS has a 20 to 25 percent water loss rate, which is above industry average. Newark PWS has not conducted a water loss audit or instituted a leak detection program.

12. The Newark PWS currently conducts annual flushing on dead-end lines. Newark PWS has not instituted a comprehensive unidirectional flushing program.